

Puget Sound Acquisition & Restoration Fund

Puget Sound Recovery Projects

Application Project Summary

TITLE: Summer Chum Riparian Project - East Jefferson			NUMBER: 09-1657R (Restoration)
			STATUS: Preapplication
APPLICANT: North Olympic Salmon Coalition			CONTACT: Rebecca Benjamin (360) 379-8051
COSTS:			SPONSOR MATCH:
RCO	\$238,046	85 %	Donated Labor \$42,080
Local	\$42,080	15 %	
Total	\$280,126	100 %	

DESCRIPTION:

Riparian habitats are the most fundamental building block for protecting aquatic freshwater and marine ecosystems and the species that depend on them. Virtually all watershed assessments and species recovery plans from landscape to reach to watershed scales call for improving riparian habitat quality, quantity and reducing their increasing fragmentation.

The primary objectives are:

1. Improve the quantity and quality of riparian areas
2. Move riparian areas toward a later seral stage to achieve water quality and habitat benefits for summer chum and other salmonids

The project seeks to fund one Washington State Conservation Corps (WCCC) crew for one year to implement the project scope. Additional private contractors may be hired to perform some of the tasks where necessary. The tasks of the project scope are: 1) tree planting 2) site preparation and maintenance for planting 3) invasive, non-native vegetation inventory and control 4) instream and estuarine restoration such as hand placement of woody debris and removal of in channel invasives and 5) monitoring implementation and effectiveness.

LOCATION INFORMATION:

COUNTY:

GOAL & OBJECTIVE:

The goal of the project is to restore native riparian vegetation along salmon bearing streams.

The objective of the project is to restore natural streamside vegetation, improve stream temperature, reduce erosion, filtration, and recruit large woody debris.

PERMITS ANTICIPATED:

None - No permits Required

SALMON INFORMATION: (* indicates primary)

Species Targeted

Bull Trout
Chum*
Coho

Cutthroat
Rainbow
Steelhead

LAST UPDATED: June 19, 2009	DATE PRINTED: June 25, 2009
------------------------------------	------------------------------------

Restoration Cost Estimate Summary

North Olympic Salmon Coalition

09-1657 R

Summer Chum Riparian Project - East Jefferson

Puget Sound Acq. & Restoration

Element/Item	Unit	Quantity	Unit Cost	Total Cost	Description Needed	Description
Worksite #2, East Jefferson County						
Riparian Habitat						
Other	Lump sum	1.00	\$127,680.00	\$127,680.00	Describe	WCC Crew, contracted services
Riparian plant materials	Each	2,613,600.00	\$0.03	\$74,600.00	Describe species	Trees
Other	Lump sum	1.00	\$18,950.00	\$18,950.00	Describe	Materials for invasive control, disposal, tools, beaver tubi
Other	Lump sum		\$2,100.00	\$2,100.00	Describe	Travel
Project Tax Amount				\$0.00		
Project A&E Amount				\$56,796.00		
Project Total Costs				\$280,126.00		

**PROJECT PROPOSAL – RESTORATION, ACQUISITION, AND COMBINATION
RESTORATION/ACQUISITION PROJECTS**

INSTRUCTIONS: Salmon Recovery Funding Board applicants must respond to the following items. Please respond to each question individually -- do not summarize your answers collectively in essay format). Local citizen and technical advisory groups will use this information to evaluate your project. Contact your lead entity for additional information that may be required. Limit your response to eight pages.

Submit information via the PRISM attachment process. Application checklists and attachment forms may be downloaded off the SRFB Web site at <http://www.rco.wa.gov/srfb/docs.htm>.

NOTE: Acquisition, Combination, Fish Passage, and Diversions and Screening projects have supplemental questions embedded within this worksheet. Please answer the questions below and all pertinent supplemental questions.

1. PROJECT OVERVIEW

Explain your project overall and include the following elements:

Riparian habitats are the most fundamental building block for protecting aquatic freshwater and marine ecosystems and the species that depend on them. Virtually all watershed assessments and species recovery plans from landscape to reach to watershed scales call for improving riparian habitat quality/quantity and reducing their increasing fragmentation.

Primary project objectives:

1. Improve the quantity and quality of riparian areas
2. Move riparian areas toward a later seral stage

The project seeks to fund one Washington State Conservation Corps (WCC) crew for one year to implement the project scope. Additional private contractors may be hired to perform some of the tasks where necessary. The tasks of the project scope are: 1) tree planting; 2) site preparation and maintenance for planting; 3) invasive, non-native vegetation inventory and control; 4) instream and estuarine restoration such as hand placement of woody debris and removal of in channel invasives; and 5) monitoring implementation and effectiveness.

a) List your primary project objectives, such as how this project will improve or maintain habitat conditions and habitat forming processes.

The primary objectives of this project are to:

- Move riparian areas toward a later seral stage by planting native conifers, shrub and hardwood species, where appropriate
- Expand the quantity and improve the quality of riparian buffers

The second objective of this project will focus on planting and nurturing areas that are high priority, low maintenance and not qualified for other programs. Sites that are qualified for other riparian programs such as the *Conservation Reserve Enhancement Program* (CREP), *Wetland Reserve Program* (WRP), or *Environmental Quality Incentive Program* (EQIP) will be referred for application to those programs. Good examples of high priority projects for the project are public and private lands in sub-estuarine and mainstem reaches with recovering but immature forests and which are usually under threat by invading plant species.

Sub-objectives include: 1) optimizing salmonid physical, biological and chemical habitat conditions; 2) improving instream water quality; 3) Control of invasive plant species; 4) Maintain the integrity and insure success of existing riparian plantings.

- b) State the nature, source, and extent of the problem that the project will address, including the primary causes of the problem, not just the symptoms. Explain how achieving the project objectives will help solve the problem. (Fish Passage projects and Diversions and Screening projects should refer to the supplemental questions later in this worksheet for further guidance on information to include in their problem statement.)**

Riparian degradation has been identified as a significant limiting factor for Summer Chum in the Summer Chum Salmon Recovery Plan (SCSRP) Table 6.1, in the Chinook Salmon and Bull Trout Recovery Plans, and in the WRIA 16 and 17 Management Plans, and in the Summer Chum Conservation Initiative. Nearly all local watershed assessments and salmon recovery plans have documented the ubiquitous and chronic degradation of riparian areas and the causes for that degradation. For further discussion of the causes of riparian degradation the reader is referred to the documents listed above.

Virtually all watershed assessments and species recovery plans from landscape to reach scales call for improving and restoring riparian habitat quality and quantity. There are also numerous limiting factors cited in multiple Salmon Recovery Plans, such as water temperature, lack of large woody debris (LWD) production, channel complexity among others, that are addressed by restoring and improving riparian habitat. Moving riparian habitats to a later successional state, and expanding the quality and quantity of riparian areas is a self-sustaining restoration technique, once they are firmly established, that will help address multiple limiting factors for Hood Canal Summer Chum (HCSC) and other salmonids. However, on the ground experience has shown that in order for riparian plantings to be successful, it takes persistent maintenance to allow the plantings sufficient time to become established and ultimately self sustaining. There are a

multitude of invasive species that will out compete new plantings, including but not limited to Reed Canary Grass, Knotweed, Bedstraw, European Bittersweet, and English Ivy. These invasives can not only overwhelm efforts to establish new plantings, but research has shown direct and indirect linkages to the presence of these species impeding riparian plant succession.

In some low-gradient streams, these species are also taking over the stream channel. As a result, this slows water velocity and not only increases water temperature, but is causing fine sediment to precipitate out of the water. Also, as the vegetation dies back it consumes the dissolved oxygen in the water and further degrades water quality. Water quality, specifically water temperature has been identified as a limiting factor in salmon recovery in several watersheds including Chimacum creek. This vegetation growing the channel has also been observed to be a barrier to adult salmon migration. This project would utilize the crew to remove invasive vegetation from the stream channel itself in areas where this is a problem. It is expected that by establishing heavy canopy cover from conifer trees, this will eliminate or at least severely limit the growth of the species that are growing in the channel (Reed Canary Grass and European bittersweet) as a long term solution. Other options for control of these species in the short term will be developed in by the task force in consultation with the Jefferson County Noxious Weed Control Board (JCNWCB).

Knotweed for example, if left untreated, will reduce riparian tree establishment and could have detrimental and long lasting effects on the successional trajectory of riparian forests, bank stability, hydrology, nutrient loading, woody debris, habitat structure, micro-habitat conditions and aquatic biota of adjacent lotic systems (Urgenson, 2006). Additional discussion regarding the ecological threat of knotweed to riparian areas is found in the Hood Canal Regional Knotweed Control Strategy (Knotweed Control Strategy) available on line:

<http://hccc.wa.gov/Salmon+Recovery/HCRKCS/default.aspx>

This project will utilize the KNOTWEED CONTROL STRATEGY which was developed by the Hood Canal Coordinating Council (HCCC) and its partners in order to have a uniform protocol for assessing and controlling knotweed and how to re-vegetate those treatment areas that require it, in the Hood Canal region.

As discussed above, without proper maintenance, mechanical, chemical or manual, riparian plantings will not be successful. This project seeks to provide a sorely needed labor and funding gap to maintain existing plantings, to install new planting and inventory and control invasives that are impeding riparian succession.

- c) Describe the fish resources (species and life history stages present, unique populations), the habitat conditions, and other current and historic factors important to understanding this project. Be specific--avoid general statements. Which salmonid species and life cycle stage(s) are targeted to benefit by this project?**

Table 6.1 of the Hood Canal Summer Chum Recovery Plan (HCSCRP) states that riparian degradation is a habitat factor for decline that affects the spawning and incubation life history stage. It cites the impacts of riparian habitat degradation as: *Removal and modification of native riparian forests increases water temperatures, reduces stability of floodplain landforms, and reduces LWD recruitment to stream channels, lack of LWD Low levels may increase redd scour, contribute to channel instability, and limit availability of adult holding pools.*

Riparian degradation is also discussed as a factor for decline in the Chinook Salmon and Bull Trout Recovery Plans, and in the WRIA 16 and 17 Management Plans.

Improving riparian habitat upstream of Hood Canal Summer Chum distribution areas is also very important as it addresses limiting factors such as water temperature and helps to ameliorate other water quality issues. All species of salmonids that utilize freshwater streams will benefit from expanding the quantity and improving the quality of riparian areas.

d) Discuss how this project fits within your regional recovery plan or local lead entity strategy (i.e., does the project address a priority action, occur in a priority area, or target priority fish species?).

As discussed above riparian degradation is mentioned as a factor for decline multiple times in the Hood Canal Summer Chum Salmon Recovery Plan. This action targets and has direct benefit to Hood Canal Summer Chum and all other salmonid species utilizing the areas where work will take place. This project is also listed in the three year work program as a regional project, is mainly focus on the watersheds that riparian areas are identified as priority watersheds in the HCSCSRP, and will occur both in the HCSC distribution reaches and upstream of them.

Implementing the two primary objectives of this project will, in the long term, help to addresses nearly all the limiting factors identified in the Hood Canal Summer Chum Recovery Plan. Having healthy riparian areas into the future, assuming they stay intact, is one of the keys to the long term success of recovering not only HCSC, but all the other salmonid species as well.

e) Has any part of this project been previously reviewed and/or funded by the Salmon Recovery Funding Board? If yes, please provide the project name and SRFB project number (or year of application if a project number is not available). If the project was later withdrawn for funding consideration or was not awarded SRFB funding, please describe how the current proposal differs from the original.

No.

When possible, list your sources of information by citing specific studies, reports, and other documents.

Urgensson, Lauren Samantha. 2006. The Ecological Consequences of Knotweed Invasion into Riparian Forests. University of Washington, College of Forest Resources, Seattle, WA

2. PROJECT DESIGN

- a) **Describe the location of the project in the watershed, including the name of the water body(ies), upper and lower extent of the project (if only a portion of the watershed is targeted), and whether the project occurs in the nearshore, estuary, main stem, tributary, off channel, or other location.**

This project will focus on the following creeks and rivers: Snow , Salmon, Chimacum, Big Quilcene, Little Quilcene, Dosewallips, and Duckabush. Projects will occur in the mainstems, tributaries, estuaries and marine riparian areas. Project sites will be on both private and public lands.

Describe the project design and how it will be implemented. Describe the extent of the project. Describe specific restoration methods and design elements you plan to employ. If restoration will occur in phases, explain individual sequencing steps, and which of these steps is included in this application. (Acquisition-only projects need not respond to this question.)

The North Olympic Salmon Coalition will, with project partners including the Jefferson County Conservation District, Jefferson County Noxious Weed Control Board, Jefferson Land Trust, and Hood Canal Salmon Enhancement Group. A Washington State Conservation Corps(WCC) crew (6 people plus crew leader) will be hired for a period of twelve months. Private contractors may be hired for as additional work force or expertise to oversee the crew as needed. The WCC crew will survey, inventory, and control exotic, invasive vegetation species along high priority freshwater reaches; prepare sites, plant, and maintain sites following recommendations from the HCCC riparian habitat assessment and follow the directives of a regional riparian task force. The task force will propose, review, and prioritize projects each month. This task force will consist of the project partners and the HCCC Habitat Assessment Biologist. The task force will work with the criteria and goals from salmon recovery plans and other science-based programs, the HCCC Riparian Habitat Assessment, the Hood Canal Regional Knotweed Control Strategy, and other local plans where applicable to assess priorities and develop planting plans for new planting projects, implement maintenance plans on riparian plantings that are already in place and will also implement the Hood Canal Regional Knotweed Control Strategy.

Crews will then be delegated a monthly work plan of projects that have the highest priority based on the aforementioned assessments, scientific merit, on-the-ground conditions, and seasonal applicability.

The extent of the project will be in riparian areas in the watersheds described above. Riparian areas are generally defined for this project by the flood prone width as determined by the NRCS 381 standard.

Specific restoration methods will be the control of invasive species that are preventing riparian succession and planting native trees and shrubs to move riparian area toward a later successional stage. These techniques for knotweed control are outlined in the Knotweed Control Strategy and the reader is referred to that document regarding specific methodology for knotweed control. Other invasives will be controlled with input from the Jefferson County Noxious Weed Control Board and the task force.

All phases of riparian restoration will occur for this project from assessment of invasive species, site preparation, planting plan development and implementation, and maintenance of existing plantings as outlined in the project scope.

- b) Describe the scale and size of the project or property(s) to be acquired, and its proximity to protected, functioning, or restored habitats. (Fish Passage only projects and Diversions and Screening only projects [i.e., not a combination] need not respond to this question.)**

The project area is spread over many watersheds listed above in their respective riparian areas. We anticipate planting at least 60 acres of new riparian plantings, maintaining 124 acres of riparian plantings and controlling 124 acres of invasives in riparian corridors. Additional opportunities for new riparian plantings may arise in 2009 and we will attempt to incorporate those into this project if budgeting allows it.

- c) Describe the long-term stewardship and maintenance obligations for the project or acquired land. For acquisition and combination projects, identify any planned use of the property, including upland areas.**

New plantings will require a *minimum* of two growing seasons of maintenance in order to be successful. Existing riparian projects are lacking in maintenance funds and projects will be maintained for the duration of the grant. Once these planting have grown sufficiently, they will be able to maintain themselves. Invasive control especially knotweed will take a minimum of three seasons. For control efforts of invasives and maintenance of existing riparian areas already underway in these watersheds, this project seeks to augment existing control efforts.

b) PROJECT DEVELOPMENT

- b) List the individuals and methods used to identify the project and its location.**

Rebecca Benjamin, North Olympic Salmon Coalition
Luke Cherney, Hood Canal Coordinating Council
Al Latham, Jefferson County Conservation District
Sarah Spaeth, Jefferson Land Trust
Eve Dixon, Jefferson County Noxious Weed Control Board
Neil Werner, Hood Canal Salmon Enhancement Group

The partners listed above are collaborating on this project. Partners met and subsequently identified the projects associated with this grant application.

- c) Explain how the project's cost estimates were determined.**

The costs estimates for new plantings were developed using the costs estimates from the Conservation Reserve Enhancement Program (CREP). Maintenance costs were estimated using the maintenance rates for the CREP program and based upon actual costs incurred performing maintenance on existing plantings. The cost of the WCC crew was obtained

from the WCC, other costs for invasive control were obtained on existing control efforts undertaken by the JCNWCB. All these tasks listed in the scope of work have been undertaken by the partners involved in this project and are based upon actual invoices and real world costs of implementing and maintaining riparian restoration projects.

d) Describe other approaches, opportunities, and design alternatives that were considered to achieve the project's objectives.

Riparian restoration has been undertaken in many other forms and with other grant sources by the project partners. This project reflects the best available techniques based on many years of installing and maintaining projects of this nature. A sample of the type of planting plans that would be implemented can be found in the attachment Sample Planting Plan.

e) Describe the consequences of not conducting this project at this time. Consider the current level and imminence of risk to habitat in your discussion.

“The best time to plant a tree is twenty years ago. The second best time is now.” – Chinese Proverb

There is an urgency to expand and restore riparian habitat, especially since it can take a decade to see a newly planted riparian area begin to provide the desired habitat processes. The sooner these plantings can take place the sooner these riparian areas will begin to provide functioning habitat. Additionally, many of the invasives are running rampant, destroying the very process we are trying to restore. There is urgent need to do this work now. Many of the areas that maintenance is needed, in channel projects such as re-meandering channels and adding LWD, the final component is to establish riparian habitat. These projects are in need of additional plantings due to mortality caused by weed competition and the fact that the trees need a few more years of maintenance to become self sustaining.

University of Washington Climate Impacts Group research scientist Jeremy Littell has cited the increase in fresh water stream temperatures as a significant impact to freshwater salmon habitat in the next 50 or so years. Planting and maintaining riparian areas now will help ameliorate this effect.

f) Describe any concerns about the project raised from the community, recreational user groups, or adjacent land owners, and how you addressed them.

Work will be performed only on willing landowners property. The sites identified for this project are existing willing landowner parcels. Outreach efforts are currently underway to identify additional willing landowners. No concerns have been raised. The partners have a long history of riparian project implementation and expect to community issues to arise.

g) Include a Partner Contribution Form, when required, from each partner outlining its role and contribution to the project. This form may be downloaded off the SRFB Web site. State agencies are required to have a local partner that is independently

eligible to be a project sponsor. A Partner Contribution Form is also required from partners providing third-party match. Contribution forms will be attached in PRISM with final application.

- h) List all landowner names. Include a signed Landowner Acknowledgement Form (available on the SRFB Web site) from each landowner acknowledging their property is proposed for SRFB funding consideration. If a restoration project covers a large area and encompasses numerous properties, Landowner Acknowledgement Forms are not required. For sponsors proposing work on their own property, this form is not required. For multi-site acquisition projects involving a relatively large group of landowners, include, at a minimum, signed Landowner Acknowledgement Forms for all known priority parcels.**

Since this project takes place on many different parcels and watersheds, Landowner Acknowledgement Forms are not required. Landowner permission will be acquired prior to any of the tasks taking place outlined in the project scope

- i) Describe your experience managing this type of project. List the names, qualifications, roles, and responsibilities for all known staff, consultants, and subcontractors who will be implementing the project. If unknown, describe the selection process.**

Rebecca Benjamin – North Olympic Salmon Coalition, NOSC has been implementing riparian projects for over 10 years. Sites include stream riparian, estuarine and nearshore.

Al Latham – Jefferson County Conservation District, JCCD has implemented riparian projects for over 15 years. Projects are large in scope and often include in-stream habitat components as well as plant installation, maintenance and invasive species control.

Eve Dixon- Jefferson County Noxious Weed Control Board, . The JCNWCB has much experience n invasive control and helped develop the KNOTWEED CONTROL STRATEGY that outlines protocol that the partners will use

All parties have had years of experience in doing this type of project and have sufficient staff on hand to collaborate in the task force process whom will be responsible for managing and taking the crew.

Any contractors used for the project will be well qualified and for the tasks delegated and will be screened by the task force.

c) TASKS AND SCHEDULE

Tasks

1) tree planting; 2) site preparation and maintenance for planting; 3) invasive, non-native vegetation inventory and control; 4) instream and estuarine restoration such as hand placement of woody debris and removal of in channel invasives; and 5) monitoring implementation and effectiveness.

General Timeline for Activities:

- January to March
 - Planting of bare root stock
 - Assessment surveys for invasive species
 - Identifying areas for planting
 - Summer Chum outmigration monitoring
- March to May
 - 1st round of maintenance
 - Assessment surveys for invasive species
 - Other noxious weed control actions
- May to August
 - 2nd-3rd round maintenance
 - Assessment surveys for invasive species
 - Knotweed treatment
 - Other noxious weed control actions
- August to October
 - Site preparation for planting
 - Knotweed treatment
 - Other noxious weed control actions
 - Adult Summer Chum spawning surveys
- October to December
 - Planting of potted stock
 - Site preparation for planting

CONSTRAINTS AND UNCERTAINTIES

Availability of a WCC cost-share crew is the biggest uncertainty at this time. The project sponsor is preparing a request for a crew and is in contact with WCC about our needs. If a crew is not available, then options for carrying out the intent of the grant would include hiring a crew that doesn't have a cost share which would result in a more costly crew and therefore less crew time. Another option is for the sponsor to hire an 'in-house' crew which again, is more costly and may not result in the same number of crew members for the same amount of time as the WCC crew would.

Another uncertainty of this project is whether or not is how many new plantings will be incorporated into this project. It is hoped that new landowners, given data from the HCCC Riparian Habitat Assessment, will want to expand or improve their riparian areas. The projects


identified at the time of application are ones that have a very high degree of certainty since most of them are projects that already exist and have landowner consent.


Each project should include an adaptive management approach that provides for contingency planning. State any constraints, uncertainties, possible problems, delays, or unanticipated expenses that may hinder completion of the project. Explain how you will address these issues as they arise and their likely impact on the project.

Availability of a WCC crew is our biggest uncertainty and if the grant is awarded and a crew is not available, options include seeking other established field crews through WCC, Student Conservation Corps or Earth Corps, or hiring an in-house crew at NOSC. Expenses for these approaches would be higher so less field time would result.


Riparian Planting & Maintenance Sites
Chimacum Cr.
Summer Chum Riparian Project

Noxious Vegetation Mgmt.
throughout watershed.

 **Critical Habitat - Summer Chum
Streams/drainages**

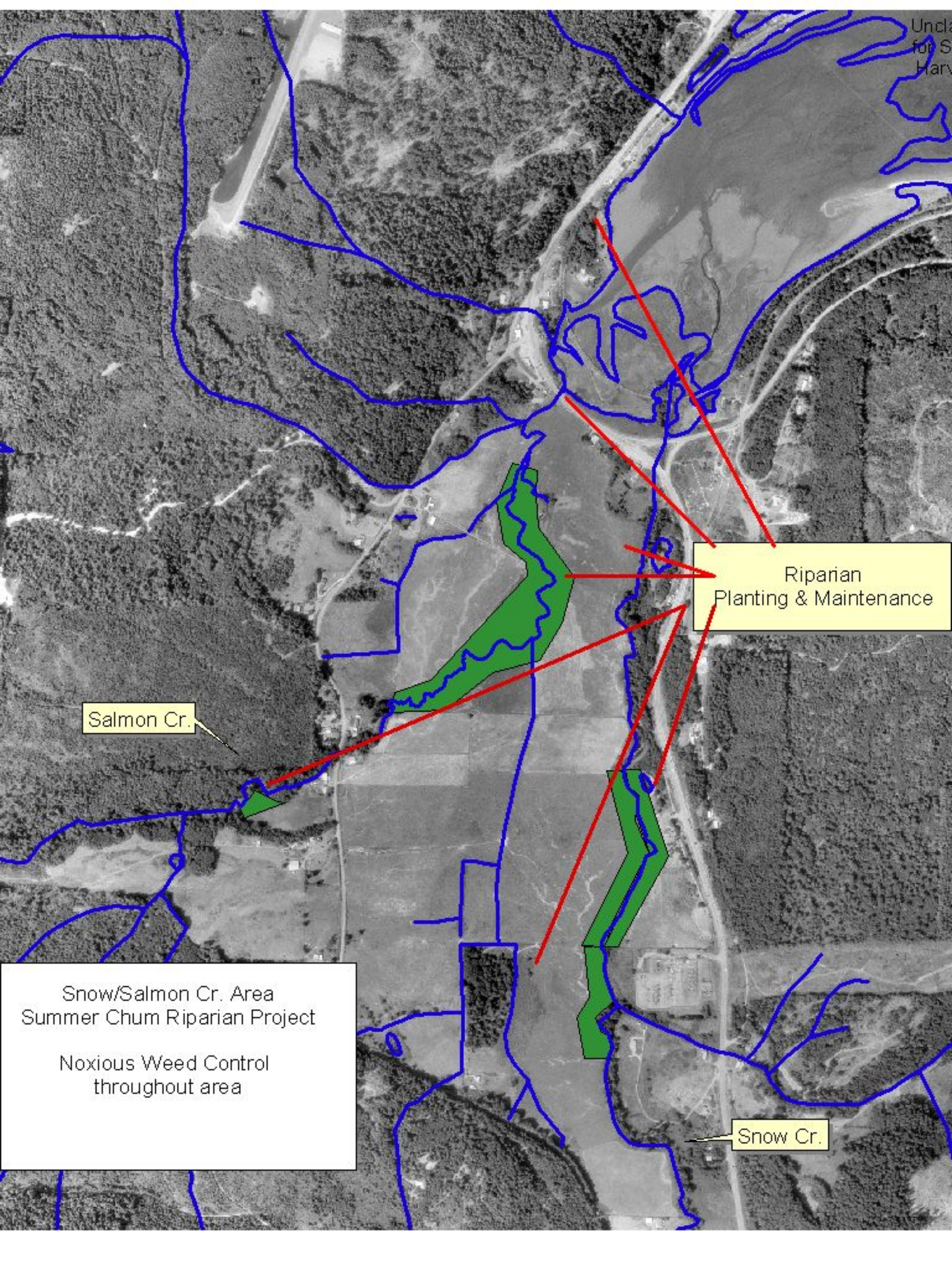


0 3000 6000 Feet



**Riparian Planting
& Maintenance -
Multiple Sites**





Unde
for S
Harv

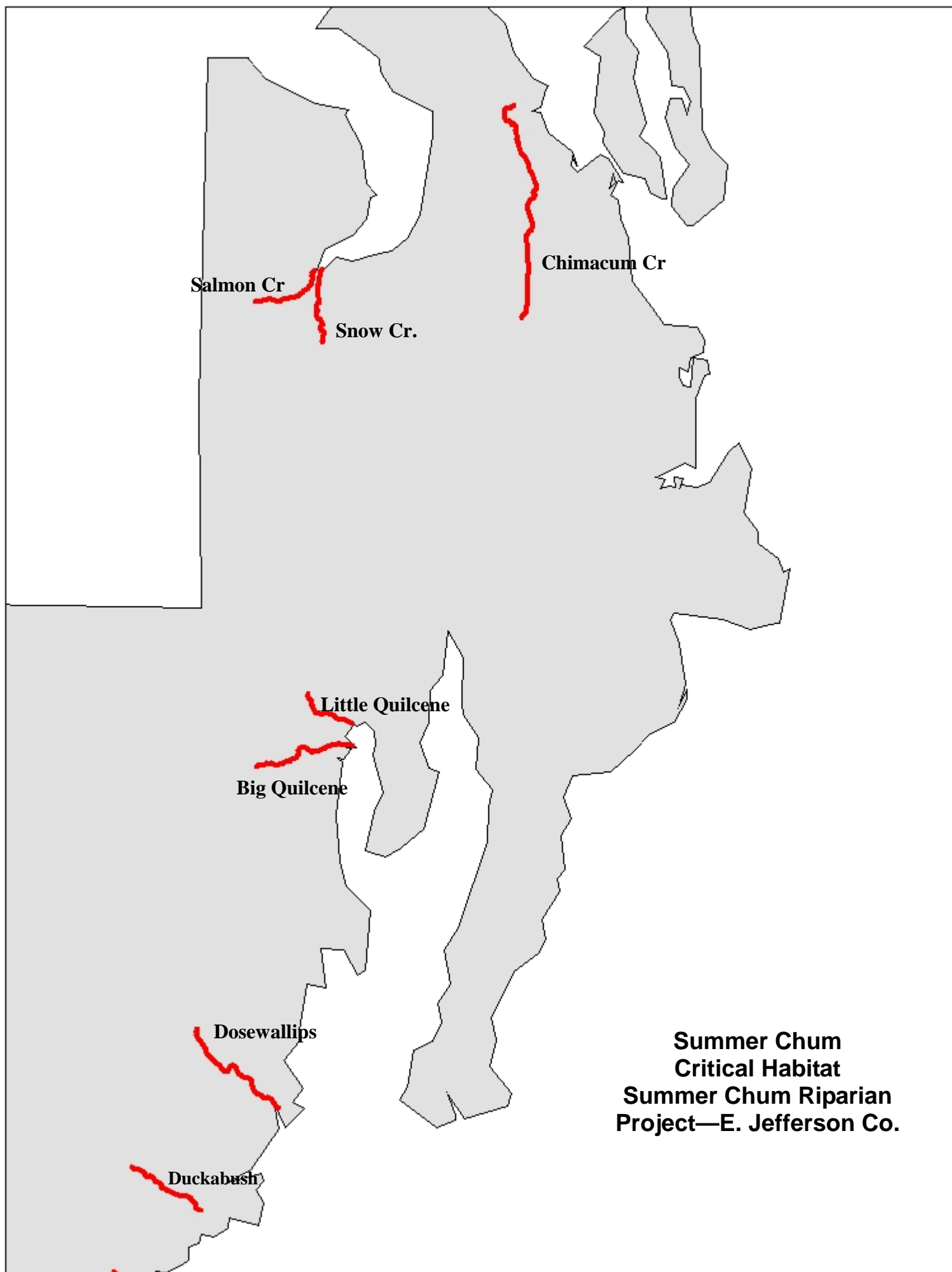
Salmon Cr.

Riparian
Planting & Maintenance

Snow/Salmon Cr. Area
Summer Chum Riparian Project

Noxious Weed Control
throughout area

Snow Cr.



Salmon Cr

Snow Cr.

Chimacum Cr

Little Quilcene

Big Quilcene

Dosewallips

Duckabush

**Summer Chum
Critical Habitat
Summer Chum Riparian
Project—E. Jefferson Co.**

Sample Planting Plan for Regional Riparian Successional Strategy Implementation

Scope

This document provides an example of a site specific planting plan that would be typical of the types of sites planted with the RRSS. This example was developed for a Estuary planting project but the general concepts of how it was developed and written would be the same for the type of riparian plantings done with the RRSS.

Planting Areas

West Unit

The West Planting Unit is approximately 2.9 acres and includes the area where the new road access and parking lot will be located. According to the design this parking and road footprint will be approximately 0.4 acres, this leaves around 2.5 acres that will be replanted with native Marine Riparian Vegetation. This unit is an open planting and will be site prepped and planted accordingly.

Current Conditions

The west unit is dominated by herbaceous species including grasses and thistle. There is also a strong population of Scotch broom with Himalayan and evergreen blackberries on the peripheries of the unit. The majority of the unit has been mowed in an effort to contain the weedy species. Additionally there is a few remnant orchard trees and on the southern end of the unit, a small stand of Douglas Fir, Pacific Madrone, Nootka Rose and Tall Oregon Grape.

Site Prep

Tractor mowing of the planting area should take place in late August. Tractor mowing as much of the site that is accessible by tractor with a brush hog. This will clear away most of the competing vegetation. Additional clearing with a brushcutter for each plant should also be done. Clear a three foot circle to a stubble height of 1" or less to create a planting spot.

Scotch Broom and Blackberry Control

Intensive effort will be required to control scotch broom and blackberry on this site. For the best results a combination of mechanical and chemical control should be used. Herbicide use should be used with methods such as cut stump, wiping or spot spraying to increase efficacy while minimizing quantities utilized on site. Other control methods that could be used is cardboard mulch with additional wood mulching on top of cardboard to help suppress areas with heavy infestations of blackberries or other undesirables.

Planting Stock

Planting should be done using one or three gallon potted stock and should occur in late November or early December. If potted stock cannot be installed due to budget constraints, bare root stock may be used and should be planted as soon as that stock is available (Jan.-Feb).

Spacing

Spacing should vary to approximate natural variation. Tree and shrub species should be well mixed with a spacing of about 8' X 8' with shrubs interspersed, except in areas of heavy blackberries where density should be higher. There should be approximately 681 trees per acre planted so for the West Planting Unit there should be about 2043 plants installed. In areas with heavy blackberries, increasing the planting a density to 4'X4' is recommended.

Species Selection

Species where chosen based on site conditions, NRCS Soils forest productivity (attached), field observations of species growing on site, consultation of local native plant lists and restoration plant guide by the WA Native Plant Society. Species chosen for planting for this unit are:

Latin	Common	PERCENT	PLANTS/	TOTAL
		Cover	Acre	Plants
<i>Arbutus menziesii</i>	Pacific madrone	5%	34	102
<i>Rosa nutkana</i>	Nootka rose	5%	34	102
<i>Rubus spectabilis</i>	Salmonberry	10%	68	204
<i>Pseudotsuga menziesii</i>	Douglas Fir	25%	170	511
<i>Pinus contorta</i>	shore pine	10%	68	204
<i>Mahonia aquifolium</i>	Tall Oregon Grape	10%	68	204
<i>Gaultheria shallon</i>	Salal	6%	41	123
<i>Prunus emarginata</i>	Bitter Cherry	1%	7	20
<i>Acer macrophyllum</i>	Big-leaf maple	25%	170	511
<i>Amelanchier alnifolia</i>	Serviceberry	3%	20	61

100%

2043

3 acres

681 plants/acre

2043 Total Plants

**Assumes 100% cover with 8'x8' spacing (681 stems per acre)*

Mulching

All plants shall be mulched with aged wood chips (hog fuel or other coarse woody material). Mulch should be 1-2" deep and extend out in a circle around the plant for at least 12". The mulch will help retain soil moisture from supplemental irrigation and help suppress competing vegetation around the tree. Mulch should be installed as quickly as possible after planting is completed.

North Unit

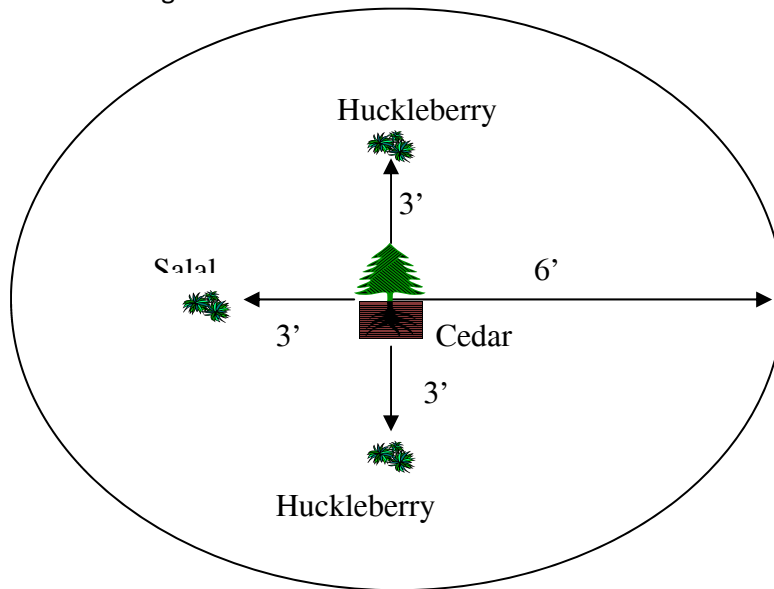
Current Conditions

The North Site is dominated by Everett gravelly loamy sand and Indianola loamy sand. This North Site is a thin strip of land approximately 5 acres in size that is constrained on the North by the North Shore Road and the South by soon to be resorted Tidal Marsh. It is unknown how much the restoration project will affect the upland vegetation; however some assumptions can be drawn based on the studies conducted for the site. While the restoration will change the current landscape, it is a fair assumption to assume the existing marine Riparian areas will not be altered to a large degree. Therefore, this plan will outline the actions to be taken in this area based on the above assumption.

Currently this area is dominated by small to medium sized Alders with an understory comprised of Salmonberry, Evergreen Huckleberry and Salal. In some small patches there are some medium to small sized Western red Cedar and Douglas Firs. The unit is an underplanting and will be site prepped and planted accordingly. This will help move this site toward a later successional state and to increase its diversity.

Site Prep and Planting Methods

Suitable planting areas need to be scouted out and marked. A suitable site is one that has a partial opening, humps or higher ground suitable for planting a cedar tree and three shrubs. Each suitable site needs to be cleared of all competing vegetation in 6' circle. Within the center of each cleared planting site one Cedar, two Evergreen Huckleberries and one Salal will be planted as depicted in the diagram below.



Planting Sock

Planting should be done using one or three gallon potted stock and should occur in late November or early December. If potted stock cannot be installed due to budget constraints, bare root stock may be used and should be planted as soon as that stock is available (Jan.-Feb).

Spacing

Suitable planting spots within the area need to be scouted out and marked with flagging prior to the crew arriving to conduct the clearing. A suitable site is one that has a partial opening, humps or higher ground suitable for planting a conifer such as Western Red Cedar, Western Hemlock or Grand Fir. Each suitable site needs to be cleared of competing vegetation in 6' circle. This will be performed using chainsaws, brush cutters, weed wrenches, or hand cutting. In the center of that clearing, the chosen conifer should be planted. If it has been determined that shrubs species are appropriate (in order to increase species diversity, ground cover, soil stability, etc.), these should be planted about three feet away from the conifer, and still well within the 6' circle. This area has already been scouted and it was determined that approximately 100 cedars would be able to fit into this unit.

Species Selection

Species were chosen based on site conditions, forest productivity soil report (attached), field observations of species growing on site, consultation of local native plant lists and the restoration plant guide by the WA Native Plant Society. Species for the north unit are:

Latin Name	Common Name	Quantity
<i>Vaccinium</i>	Evergreen	200
<i>ovatum</i>	Huckleberry	
<i>Thuja plicata</i>	Western Red Cedar	100
<i>Gaultheria</i>		
<i>shallon</i>	Salal	100

Plant Protectors

All plants should have a plant protector installed around the plant. These protectors shall be made of a perforated sturdy plastic material, not to exceed 12" in height. The protector bottom should be buried into the soil no less than 1" to prevent rodents from getting under the protector. The protector shall be solidly secured to a 1"X2"X24" wooden stake by means of staples or zip ties. The stake shall be securely pounded in the ground at least 12".

Maintenance

Maintenance will need to be performed for the first few growing season after the site is planted. Maintenance will consist of clearing away any competing vegetation around the plants in a 24" circle. This can be accomplished by utilizing a brush cutter or other means as long as the plant is not damaged and there is minimal disturbance to the mulch. Pulling of scotch broom re-sprouts and spot spraying or cut stumping of blackberries should also occur. Any herbicide applied should not drift onto trees or shrubs.

Watering of the plants for the first two planting seasons should also occur, especially on the West Site. This is due to the fact of the exposure to the sun and the very coarse soil. The timing

and quantity of watering cannot be specified as it will depend on the weather. Watering through the dry summer months July, August and September will be critical the first year and highly important the second year to seedling survival. Finding an adequate source for irrigation water will be problematic. There are several private residences that have wells, but during summer these wells have very low flow. There is no source of water on the property. It may be necessary to utilize a large capacity water tank mounted on a truck to provide water to the planting site.

Timeline of Activities

Summer 2009

- Construction Levee removal
- Site Prep
 - Mowing
 - Removal and cut stump herbicide treatment of blackberries and large Scotch Broom
 - Flagging and clearing of the planting spots on the North Site

Fall/Winter 2009

- Planting
- Mulching
- Tree Protector installation

Spring/Summer 2010

- Maintenance
 - Mowing
 - Brushcutting
 - Scotch Broom Control
 - Blackberry control
 - Thistle Control?
 - July-Oct. 15th Supplemental Irrigation as needed
 - Monitor for seedling mortality
- Collect survival data for monitoring

Fall 2010

- Maintenance (same as above)
- Replace any seedlings that died

Spring/Summer 2011

- Maintenance (same as above)

Fall 2011

- Maintenance (same as above)